

C. M. 1.
AUG 26 1966

X4-A9.1/111

To: Members of X4-A9.1

Subject: Proposed ASCII Keyboard Arrangement

Attached for your review and consideration is my contribution for a keyboard arrangement implementing ASCII. The Task Group has been working for a couple of years to develop a standard proposal and in my opinion are no further advanced than a year ago. In fact, where it was believed a satisfactory agreement had been reached some members disagreed because the proposal or compromise did not entirely reflect 100% of their needs.

Our purpose is to develop a keyboard arrangement readily adaptable to any number of products which require operator keying as the prime input function. Therefore, the emphasis should be placed on the human aspect rather than as some propose on the technical and mechanical aspects of adapting not the character set of the ASCII but the bit code configuration.

For a keyboard standard to be acceptable and not just a "paper standard" the X4-A9.1 proposal must satisfy the User. Eventually, the User must pay for standardization.

The proponents of bit configuration state their implementation is best because of the low cost. Low cost to whom? What is the total cost? Is it the keyboard device or is it the total cost of the keying station? In reviewing the aspect of cost since it is advanced as an argument, I find the keyboard device to be 5 to 10% of the cost. The remainder is labor (operator), floor space, etc. Of the remainder of the cost, 80% is the operator. Therefore, any keyboard device should enhance the productivity of this cost by reducing keying errors, minimize training, facilitate interchange of operators, etc.

My proposal which is based on two concepts to increase productivity and provide a base upon which diversified products, visual display accounting machines, teleprinters, keypunches, typewriters, etc. can be designed is first code insensitivity, and second modular design.

Figure 1 shows the full ASCII character set. This is to provide guidance to designers and users requiring the full character set for a general purpose keying station. It is recognized few will utilize such a station, however, the arrangement does satisfy this small need.

CB 81/20/2

The heart or core are the 42-44 key positions commonly found on a majority of electric typewriters in the United States. It is designed to satisfy the vast majority of trained operators who will utilize keyboard devices in the future. The remaining keys contain graphics to satisfy the programmers needs.

The Function Keys, Tab, Carriage Return, Backspace, Shift, are grouped to either side to facilitate their use. These keys could be labeled Multi-punch, Print, Enter, Erase, Start, etc. to satisfy display device keypunch designers.

The Control Keys are grouped in clusters to either side. The specific placement of characters can be discussed dependent upon their frequency of use in applications. In many instances very few will be used thereby providing buffer zones between the core and the control keys.

Figures 2 and 3 show other uses of the flexible arrangement to satisfy other than the general purpose type applications.

The advantages of the proposal are:

1. Familiar alphanumeric arrangement for general purpose use to facilitate training of operators and interchange of operators thereby reducing the User cost of keying station.
2. Reduce keying errors. No control shift for function or control key operation is employed. Human factors testing and my experience with multi-shift keyboards has shown control shifting to be a common cause of operator miskeying.
3. Code insensitivity permits collapsing to 41, 48, 52, 60, 64, 88 characters without additional cost.
4. Special numeric key sections can be employed to satisfy data processing, OCR, and bookkeeping applications.
5. Special keys not defined in ASCII such as Reverse Tab, Reverse Index, can be inserted in vacated areas at minimal cost.



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GENERAL PURPOSE - 128 CHARACTER ASCII KEYBOARD

1 SO	2 SI	3 FS	4 [{	5 ! 1	6 @ 2	7 # 3	8 \$ 4	9 % 5	10 \ 6	11 & 7	12 * 8	13 (9	14) 0	15 - _	16 + =	17] }	18 BS	19 ACK	20 ENQ	21 DLE	22 EOT
23 DC ₁	24 DC ₂	25 GS	26 HT (Tab)	27 Q	28 W	29 E	30 R	31 T	32 Y	33 U	34 I	35 O	36 P	37 ^ <	38 >	39 ~ _	40 NAK	41 SOH	42 STX	43 ETB	44 ETX
45 DC ₃	46 DC ₄	47 RS	48 Lock	49 A	50 S	51 D	52 F	53 G	54 H	55 J	56 K	57 L	58 : ;	59 " '	60 CR	61	62 LF	63 ESC	64 SS	65 NUL	
66 FF	67 VT	68 US	69 SHIFT	70 Z	71 X	72 C	73 V	74 B	75 N	76 M	77 ; .	78 :	79 ?	80 /	81 SHIFT	82	83 SYN	84 CAN	85 BEL	86 EM	87 DEL
SPACE																					

FIGURE 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
												Ø									
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
				Q	W	E	R	T	Y	I	2	3	P								
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	
				A	S	D	F	G	H	4	5	6									
66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
					Z	X	C	V	B	N	7	8	9								

SPACE

FIGURE 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
																		7	8	9	
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
																		4	5	6	
45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	
																		1	2	3	
66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
																			8		

SPACE

FIGURE 3